



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,230	03/12/2004	Kazuhito Matsuda	TOW-067	8565
959 7590 06/13/2007 LAHIVE & COCKFIELD, LLP ONE POST OFFICE SQUARE BOSTON, MA 02109-2127			EXAMINER LAIOS, MARIA J	
			ART UNIT 1709	PAPER NUMBER
			MAIL DATE 06/13/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/800,230

Applicant(s)

MATSUDA ET AL.

Examiner

Maria J. Laios

Art Unit

1709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3, 4, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Dickman et al (US 20030008186).

As to claim 1, Dickman discloses a fuel gas production apparatus for reforming a hydrogen-containing fuel to produce a hydrogen-rich fuel gas, comprising a reforming mechanism for reforming, *including an auto-thermal reforming (ATR) system* the hydrogen-containing fuel to obtain a reformed gas (230 and paragraph 94); a PSA mechanism (38) directly connected to said reforming mechanism (230) for removing impurities from said reformed gas to refine said reformed gas into said fuel gas, (paragraph 97); wherein said reforming mechanism (230) uses said hydrogen containing fuel, steam and oxygen to induce oxidation reaction and reforming reaction simultaneously. While Dickman discloses wherein the reforming mechanism uses hydrogen containing fuel (16, paragraph 38), steam (paragraph 66) and oxygen (58), the material worked upon does not limit an apparatus claim. MPEP 2115.

As to claim 3, while Dickman discloses said hydrogen-containing fuel is methane (Paragraph 38) the material worked upon does not limit an apparatus claim. MPEP 2115.

As to claim 4, Dickman discloses a fuel cell system comprising (Figure 1, 10): a fuel gas production apparatus (Figure 1, 12 fuel processor) for reforming a hydrogen-containing fuel to produce a hydrogen rich fuel gas; and a fuel cell (Figure 1, 22 fuel stack) using said fuel gas (Figure 1, 14) supplied from said fuel gas production apparatus, wherein said fuel gas production apparatus comprises: a reforming mechanism *including an auto-thermal reforming (ATR) system* (Figure 16, 230 and paragraph 94) for reforming the hydrogen-containing fuel to obtain a reformed gas; and a PSA mechanism (Figure 16, 38 and paragraph 97) directly connected to said reforming mechanism for removing impurities from said reformed gas to refine said reformed gas into said fuel gas, wherein said reforming mechanism uses said hydrogen containing fuel, steam and oxygen (Paragraph 39) to induce oxidation reaction and reforming reaction simultaneously. While Dickman discloses wherein the reforming mechanism uses hydrogen containing fuel (16, paragraph 38), steam (paragraph 66) and oxygen (58), the material worked upon does not limit an apparatus claim. MPEP 2115.

As to claim 6, while Dickman discloses a fuel cell system according to claim 4, wherein said hydrogen-containing gas is methane (Paragraph 38) the material worked upon does not limit an apparatus claim. MPEP 2115.

3. Claim 7 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Dickman (US 20030008186).

While Dickman discloses an air delivery assembly (paragraph 33), Dickman fail to explicitly state that an air blower is used. It is either inherent or an obvious variant for an air delivery assembly to include a blower so that the air can in fact be delivered as required.

4. Claims 1-3 are rejected under 35 U.S.C. 102(e) as being anticipated by Woods et al (US 2003/0046867 A1, hereinafter Woods).

With regards to claim 1, Woods discloses a fuel gas production apparatus for reforming a hydrogen-containing fuel to produce a hydrogen rich fuel gas (abstract) comprising a reforming mechanism including an auto-thermal reforming (ATR) system (Figure 4, 70) for reforming the hydrogen containing fuel to obtain a reformed gas; a PSA (50) mechanism directly connected (via 90, Heat Recovery Steam Generator, 34, intercooler, 40, Condensate blow down tank, all units that do not induce a chemical reaction as defined by applicant) to said reforming mechanism for removing impurities from said reformed gas to refine said reformed gas into said fuel gas, wherein said reforming mechanism uses said hydrogen containing fuel (12), steam and oxygen (84) to induce oxidation reaction and reforming reaction simultaneously.

With regards to claim 2, Woods discloses a cooling mechanism (90, 34, 40) provided between reforming mechanism (70) and PSA (50) mechanism.

With regard to claim 3, Woods discloses the hydrogen containing fuel as methane (Paragraph 19).

***Claim Rejections - 35 USC § 103***

5. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dickman (US 20030008186), as applied to claim 4 above, and further in view of Hirata (US 20020031458 A1).

With regard to claim 7, Dickman discloses an air steam entering the cathode region of the fuel cell stack (paragraph 32) but fails to disclose a blower. Hirata also discloses a fuel cell system with a fuel-processing unit and teaches the use of a compressor unit (28)/blower in order to effectively supply air to the fuel cell (paragraph 49). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the compressor/blower of Hirata for the transportation of air to the fuel cell of Dickman in order to effectively supply the required air.

6. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woods et al (US 2003/0046867 A1) in view of Dickman et al (US 20030008186).

With regards to claim 4, Woods discloses a fuel gas production apparatus for reforming a hydrogen containing fuel to produce a hydrogen rich fuel gas (abstract); where in the fuel gas production apparatus comprises: a reforming mechanism including an auto-thermal reforming (ATR) system (Figure 4, 70) for reforming the hydrogen containing fuel to obtain a reformed gas; a PSA (50) mechanism directly connected (via 90, Heat Recovery Steam Generator, 34,

Art Unit: 1709

intercooler, 40, Condensate blow down tank, all units that do not induce a chemical reaction as defined by applicant) to said reforming mechanism for removing impurities from said reformed gas to refine said reformed gas into said fuel gas, wherein said reforming mechanism uses said hydrogen containing fuel (12), steam and oxygen (84) to induce oxidation reaction and reforming reaction simultaneously but fails to disclose the fuel production system supplying the fuel to a fuel cell system.

Dickman discloses a fuel cell system (Figure 1, 10) with a fuel processing system (12).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the fuel gas production unit of Woods as a fuel source for the fuel cell system of Dickman as a further use of the gas production system.

With regard to claim 5, Woods discloses a cooling mechanism (90, 34, 40) provided between reforming mechanism (70) and PSA (50) mechanism.

With regards to claim 6, Woods further discloses the hydrogen containing fuel as methane (Paragraph 19).

### ***Response to Arguments***

#### ***Specification***

7. Objection to the specification is withdrawn.

#### ***Claims***

8. The Burch Reference

Due to applicant's argument on page 7, the Burch Reference has been withdrawn.

9. The Dickman Reference

Applicant argues that the Dickman reference does not disclose an auto thermal reformer. The examiner respectfully disagrees because Dickman does disclose that the reformer may alternatively be an auto thermal reformer, Paragraph 94 sentence 5 “Alternatively, reformer 230 may be an auto thermal reformer that includes a auto thermal reforming catalyst”.

10. The Hirata Reference

Due to the applicant’s argument on page 9, that Hirata fails to cure the deficiency of Burch, the Hirata reference is no longer used in the rejection therefore the argument is moot.

***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria J. Laios whose telephone number is 571-272-9808. The examiner can normally be reached on Monday - Thursday 9:30 - 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 1709

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJL



**BARBARA GILLIAM  
PRIMARY EXAMINER**